



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/483,569	01/14/2000	Stephen S. Oh	TI-23373	8551

23494 7590 05/29/2002

TEXAS INSTRUMENTS INCORPORATED
P O BOX 655474, M/S 3999
DALLAS, TX 75265

EXAMINER

SMITS, TALIVALDIS IVARS

ART UNIT PAPER NUMBER

2654

DATE MAILED: 05/29/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Me

Office Action Summary

Application No.
09/483,569

Applicant(s)
Stephen S. Oh et al.

Examiner
Talivaldis Ivars Smits

Art Unit
2654



– The MAILING DATE of this communication appears on the cover sheet with the correspondence address –

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE three MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on _____
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 35 C.D. 11; 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above, claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirements.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on Jan 14, 2000 is/are a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
*See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s). 2 6) ☐ Other:

DETAILED ACTION

Specification

1. The Abstract of the disclosure is objected to because it is too long. An Abstract should not exceed 150 words or 25 lines of text. Correction is required. See MPEP § 608.01(b).

Claim Objections

2. Claims 4, 7, 8, 12, 15, and 16 are objected to because of the following informalities:

Claims 4 and 12 are backwardly phrased. Applicant is actually calculating the power estimate by **taking the absolute value of** the frequency-transformed windowed acoustic samples, rather than “using the absolute value of the power estimate”, which would have been superfluous, since any “power estimate” is necessarily nonnegative.

Claims 7, 8, 15, and 16 are objected to because they do not define the symbols $G(i)$, $N^{iv}(i)$, $P^i(i)$, i , t , and n recited therein, and do not state whether and how, if at all, $N(i)$ in claims 8 and 16 differs from $N^n(i)$ of claims 7 and 15.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are

such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Leland S.

Bloebaum *et al.* (U.S. Patent 6,070,137, filed January 7, 1998).

As per claims 1 and 9, Bloebaum *et al.* teach windowing (framing) and Fast-Fourier-Transforming a received stream of sampled acoustic signals (col. 5, line 11), computing a power spectral estimate (col. 5, lines 17-18), using only half the Fourier-transformed data (single-sided) because of the complex-conjugate symmetry of a Fast Fourier Transform of real signals alluded to (col. 5, lines 8-10), smoothing the power estimate over time when there is no speech to calculate a noise power estimate (col. 5, lines 37-44 and 60-65), calculates a gain function (enhancement filter, col. 6, lines 8-10) from the signal and noise power estimates, calculating a transformed signal by multiplying the transformed window signal by the gain function (col. 6, line 35-41).

Bloebaum *et al.* are interested in speech (voice) *coding* rather than speech *decoding*, and thus do not explicitly teach calculating an (enhanced) speech signal by doing an inverse FFT on the transformed window signal. However this is suggested by them, since an artisan at the time of invention would have known, from her digital signal analysis course, to inverse-FFT the transformed enhanced speech signal to obtain back a time-domain version thereof, for playback to the listener.

As per claims 2 and 10, Bloebaum *et al.* do not teach a frame size of 32 samples.

However, it would have been obvious for an artisan at the time of invention to use a “power of two” sample size to enable FFT processing, and 32 samples would correspond to somewhere between 5 and 2.5 milliseconds of speech data, one of the standard speech frame sizes (5, 10, 20 milliseconds). It would have been obvious for an artisan at the time of invention to use standard speech frame sizes so as to enable her to use conveniently-available standard signal processing hardware and software.

As per claims 3 and 11, Bloebaum *et al.* do not say what inherent window they are using. However, an artisan at the time of invention would have known to use a Hanning (raised cosine) window because of its notoriously well-known convenience of enabling “unwindowing” by addition after inverse FFT when using 50 percent Hanning time window overlap.

As per claims 4, 5, 12, and 13, Bloebaum *et al.* teach using an absolute value squared power estimation (Figure 3, element 44; col. 5, lines 17-19). This necessarily uses the absolute value of the signal FFT spectral estimate.

As per claims 6-8 and 14-16, Bloebaum *et al.* suggest the recited formula for the gain function (col. 6, lines 15-21, with $r=1$, $s=1$. and “others are not outside the scope of this invention”); their parameter η , corresponding to the recited λ , being in effect subtracted from the total power, implies increasing the necessarily subtracted noise spectral estimate by a small margin).

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. David E. Borth *et al.* (U.S. Patents 4,628,529, 4,630,304, and 4,630,305, issued December 9, 1986, December 16, 1986, and December 16, 1986, respectively), Murtaza Ali (U.S. Patent 6,144,937, filed July 15, 1998), and Steven H. Isabelle (U.S. Patent 6,122,610, filed September 23, 1998) are some typical patents disclosing noise suppression by spectral gain (enhancement filtering) processing.

6. **Any response to this action should be mailed to:**

Commissioner of Patents and Trademarks
Washington, D.C. 20231

or FAXed to:

(703) 872-9314 (please label *formal* communications
"OFFICIAL"; please label *informal* or draft communications,
"PROPOSED" or "DRAFT")

Hand-delivered responses should be brought to Crystal Park 2, 2121 Crystal Drive,
Arlington, VA, Sixth Floor (Receptionist).

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to the examiner, Talivaldis Ivars Smits, whose telephone number is (703) 306-3011. The examiner can normally be reached Mondays-Fridays from 8:30 a.m. to 5:00 p.m.

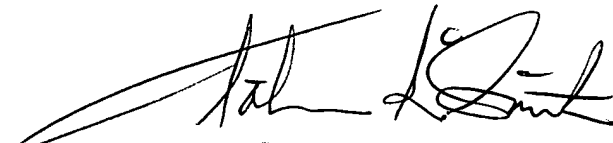
As of January 14, 2002 the former Art Unit 2641 in Technology Center 2600 has been redesignated as **Art Unit 2654**, which new AU number should be used in all future correspondence.

Application/Control Number: 09/483,569
Art Unit: 2654 (formerly 2641)

Page 6

If attempts to reach the examiner by telephone are unsuccessful, the examiner's new supervisor as of that date, Marsha D. Banks-Harold, can be reached on (703) 305-4379. The facsimile phone number for Technology Center 2600 is (703) 872-9314.

Any inquiry of a general nature or relating to the status of this application should be directed to the Technology Center 2600 customer service, whose telephone number is (703) 306-0377.



TĀLIVALDIS MĀRS ŠMITS
PRIMARY EXAMINER

Art Unit 2654
May 23, 2002